



**Asia-Pacific  
Economic Cooperation**

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**2013/SOM3/OFWG/034**

Agenda Item: IV D 3

**Report on Outcomes of Completed APEC-Funded  
Project FWG 01/2010A - Potential Contribution of  
Small Pelagic Fish to Food Security Within the Asia-  
Pacific Region**

Purpose: Information

Submitted by: Peru

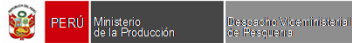


**2nd Ocean and Fisheries Working Group  
Meeting  
Medan, Indonesia  
23-25 June 2013**

# Potential Contribution of Small Pelagic Fish to Food Security within the Asia-Pacific Region

Project FWG 01 / 2010A

June - 2013



## APEC and Food Security

First meeting of Ministers Responsible for Food Security, Niigata, Japan, 2010

- \* Peru agreed to study the potential supply and use of small pelagic fish products for direct human consumption
  - \* The Paracas Action Agenda emphasized support towards initiatives that incorporate sustainably managed small pelagic fish for human consumption
- Project FWG 01 / 2010A



## Small Pelagic Fish (SPF)

- \* High amounts of high quality animal protein, amino acids, minerals and vitamins A and D
- \* Valuable source of fatty acids required for the correct development of the brain in unborn babies and infants, and prevention of cardiovascular disease (Eicosapentaenoic acid EPA and Docosahexaenoic acid DHA)
- \* There is a long and varied tradition of fish consumption in Asia that includes small pelagic fish an important part of daily diets

## Strategic partners and sponsor economies



## Aim

Contribute to the long term food security in Indonesia and Philippines by offering a sustainable source of high-quality protein at low cost, providing examples to other APEC economies

## Objectives

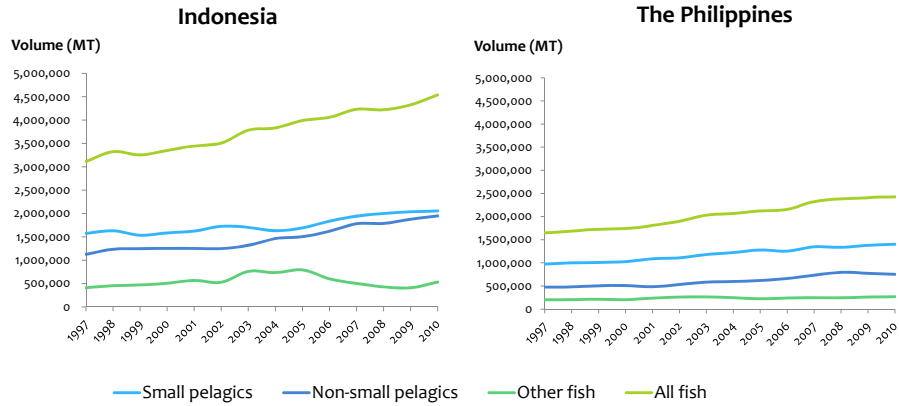
- \* Understand local consumption habits and levels of capture of small pelagic fish (SPF), and identify strategies to overcome market impediments for their consumption and novel products for human consumption
- \* Share the research and management techniques for monitoring and regulating small pelagic fisheries in Peru and identify programs that could be applied in order to help manage and regulate these fisheries
- \* Share the Peruvian experience with the APEC economies of Philippines and Indonesia in the following areas: (i) technology in the production of value-added products from small pelagic fish for human consumption (e.g., smoked, salted, paste, and other forms); and (ii) marketing strategies for promoting the use of small pelagic fish for human consumption

## Methods

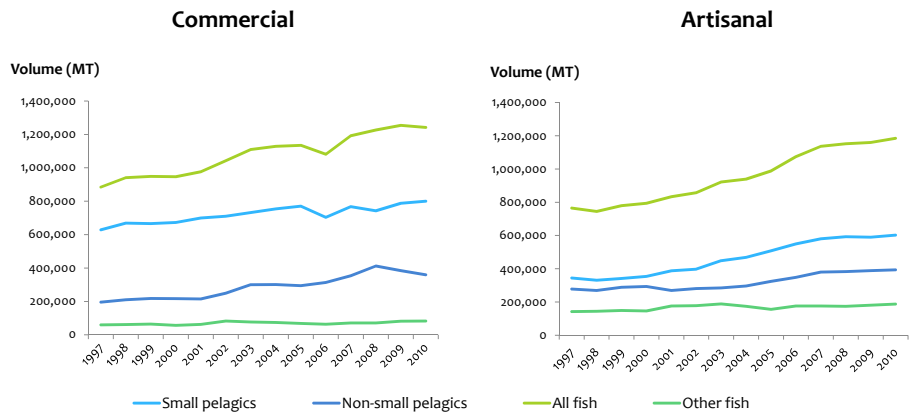
1. Literature review
2. Observational research (ports, landing areas, processing plants and markets)
3. Analysis of fish extraction statistics
4. Surveys on human consumption habits
5. Interviews with key stakeholders
6. Visit of the representatives from Indonesia and the Philippines to Peru to exchange knowledge and experience

## Results: Availability

## Contribution of SPF to marine fish production from 1997 – 2010

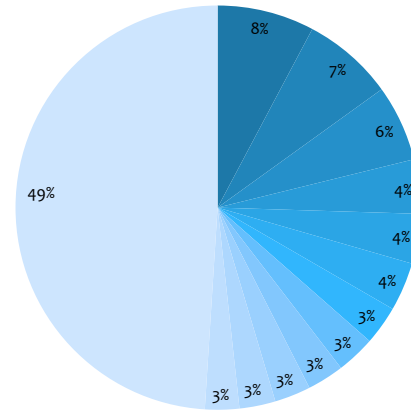


## Commercial vs Artisanal (Municipal) Fisheries in the Philippines, 1997 - 2010



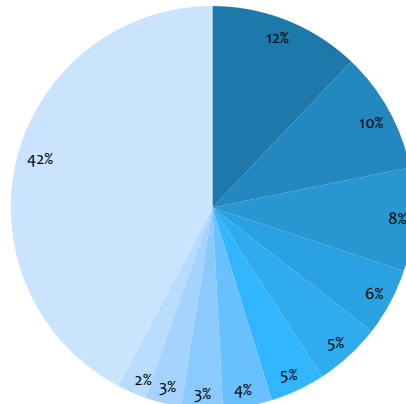
## Contribution of SPF to the top most productive marine fish, Indonesia 2010

- Round scads
- Skipjack tuna
- Short mackerel
- Goldstripe sardinella
- Yellowstripe scad
- Stolephorus anchovies
- Kawakawa
- Narrow-barred spanish mackerel
- Frigate tuna
- Bali sardinella
- Southern bluefin tuna
- Red snappers
- Other fish



## Contribution of SPF to the top most productive marine fish, Philippines 2011

- Spotted sardinella
- Round scads
- Skipjack
- Frigate tuna
- Yellowfin tuna
- Bigeye scad
- Goldstripe sardinella
- Indian mackerel
- Stolephorus anchovies
- Slipmouth
- Other Species

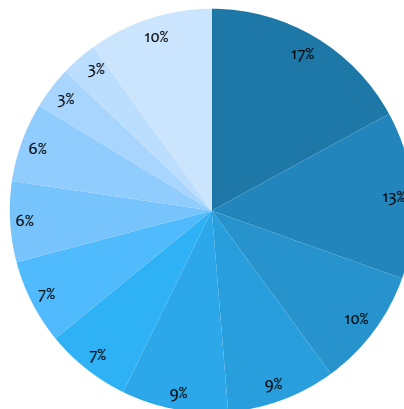


## Production volumes of the top SPF 2010

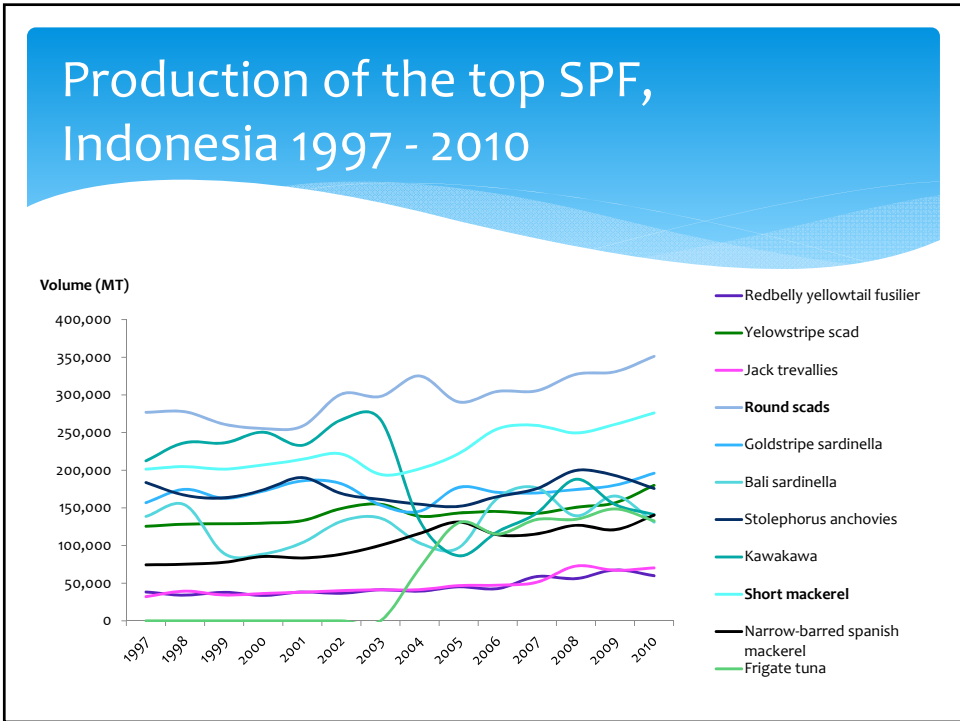
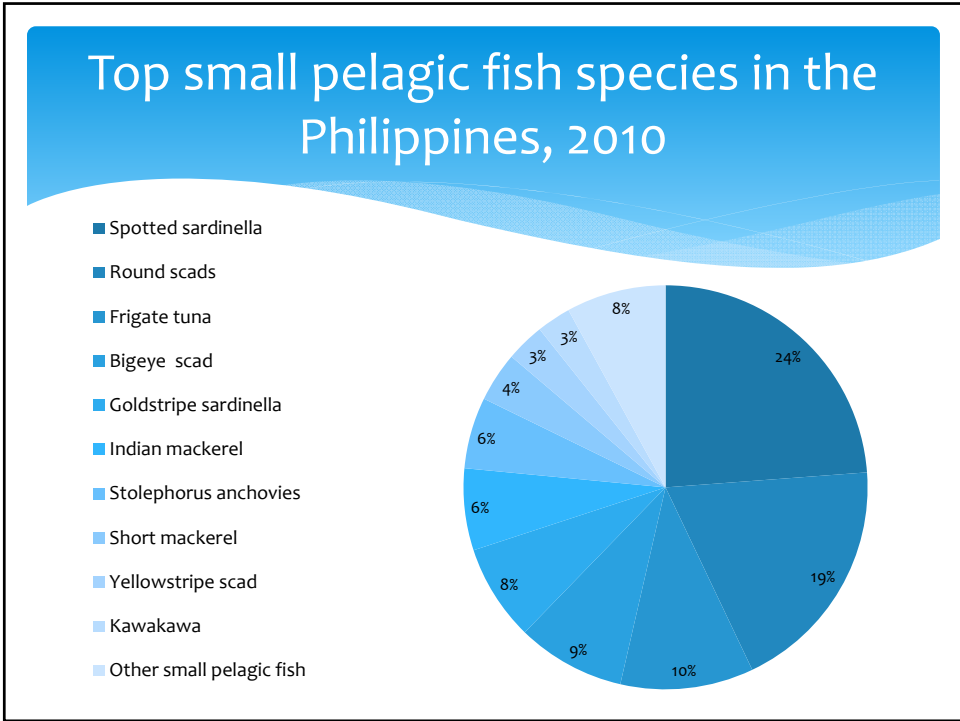
Indonesia		Philippines	
Species	Volume (MT)	Species	Volume (MT)
1. Roundscads	351,216	1. Spotted sardinella	334,030
2. Short mackerel	276,110	2. Round scads	268,227
3. Goldstripe sardinella	196,067	3. Frigate tuna	149,566
4. Yellowstripe scad	179,940	4. Bigeye scad	121,522
5. Stolephorus anchovies	175,726	5. Goldstripe sardinella	108,015
6. Kawakawa	141,190	6. Indian mackerel	91,857
7. Narrow-barred Spanish mackerel	140,277	7. Stolephorus anchovies	80,183
8. Frigate tuna	132,733	8. Short mackerel	55,708
9. Bali sardinella	131,137	9. Yellowstripe scad	43,497
10. Jack trevallies	70,317	10. Kawakawa	38,236
11. Redbelly yellowtail fusilier	59,890		
<b>Total</b>	<b>1,854,603</b>	<b>Total</b>	<b>1,290,841</b>

## Top small pelagic fish species in Indonesia, 2010

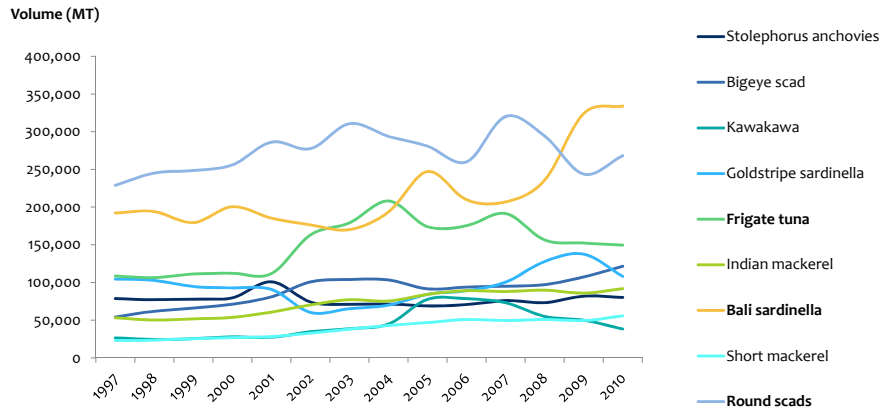
- Round scads
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- Stolephorus anchovies
- Kawakawa
- Narrow-barred Spanish mackerel
- Frigate tuna
- Bali sardinella
- Jack trevallies
- Redbelly yellowtail fusilier
- Other small pelagic fish



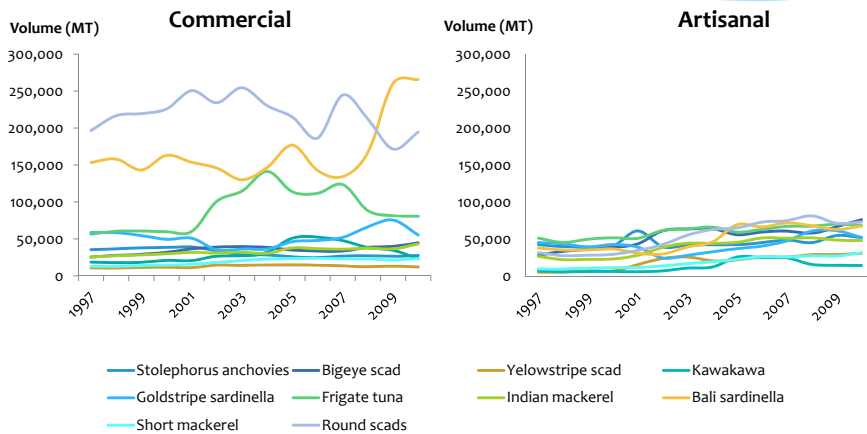




## Production of the top SPF, Philippines 1997 - 2010



## Production of the top SPF Commercial vs Artisanal, Philippines 1997 - 2010



## Status of SPF stocks, Indonesia

- \* Out of the 11 fishing management areas for SPF, 4 are overexploited, and some of the main areas have already collapsed
- \* Stocks of the Bali sardinella, Indian mackerel, short mackerel, round scads and the goldstripe sardinella are overexploited
- \* Closures for SPF have not been possible, the population of fishermen exceeds 2.2 million people, so there is great opposition towards measures that reduce fishing
- \* Political will is key for the successful implementation of management measures such as fishing closures which are crucial for the sustainability of the SPF resources

## Status of SPF stocks, Philippines

- \* Most of the coastal fishing grounds are already overexploited
- \* Iconic species of food security such as scads, sardines and anchovies have declined due to poor management, resulting on sharp price increases adding further stress to food security
- \* Management tools such as closures are in use since 2011 with successful results recovering sardine stocks
- \* It took a long process of education and strong political will to achieve this closure, more work needs to be done to strengthen the sustainability of all small pelagics

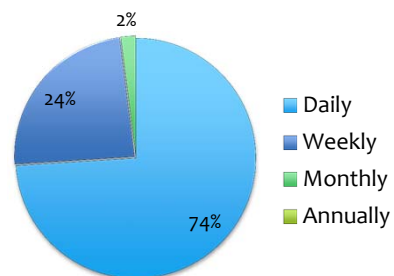
## Surveys conducted to understand consumption habits of SPF

Survey group	Indonesia	The Philippines	Total
Coastal			
- Fishing community	24	44	68
- Non-fishing community	27	85	112
Non-coastal	1	35	36
Total	52	164	216

## Fish consumption habits in Indonesia and the Philippines

- \* All of the interviewees consumed fish
- \* Those who consume fish daily have the habit of eating fish 3 times a day everyday

Overall consumption frequency



## Fish as staple food

### Coastal Communities

- \* Indonesia, 9% consider fish a staple food
- \* Philippines, 28% consider fish a staple food

→ However, frequency of consumption is very high, with a high proportion of respondents eating fish daily, there might be a misconception on the meaning of staple food

### Non-coastal communities (Philippines)

- \* 82% mentioned fish as a staple food, though their consumption frequency was not reported that high (it could be due to the daily use of fish sauce for seasoning and the habit of having fish chowder as a starter for meals)

## Fish as source of animal protein

### Coastal communities

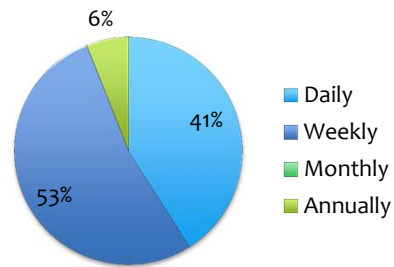
- \* Indonesia, 64% have fish as main source of animal protein
- \* Philippines, 74% have fish as main source of animal protein

### Non-coastal communities (Philippines)

- \* The top source of animal protein was pork, 29%, followed by fish with 18%

## Frequency of fish consumption in non-coastal communities, Philippines

- \* The monthly category was not mentioned. People in the cities either consume fish often consume it very little
- \* In coastal communities fish consumption is a very common habit
- \* The results from either coastal or non-coastal areas remain quite high.



## Preferred species

### Coastal

Indonesia:

- \* Small tuna and the Bali sardinella

Philippines:

- \* Small tuna and round scads

### Non-coastal (Philippines)

- \* Bigeye tuna\*, round scads, Indian mackerel and small tuna.

Small tuna



Round scads



Bali sardinella



Indian mackerel



Photos: Randall, J.E (Fishbase)

**Commonly consumed species**

**Coastal communities**


Indonesia:

- \* Small tuna, narrow barred Spanish mackerel and round scads


Philippines:

- \* Round scads, sardines and big eye scads


Big eye scads




Small tuna




Narrow barred Spanish mackerel



Round scads



Sardines



Photos: Randall, J.E (Fishbase)


**Commonly consumed species**

**Non-coastal communities (Philippines)**


- \* Bigeye scad, round scads, Stolephorus anchovies and siganid\*

→ The reason that guides choice for fish is taste, followed by availability and affordability

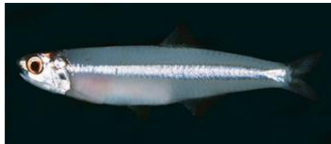
Big eye scads



Round scads



Stolephorus anchovies



Photos: Randall, J.E (Fishbase)

## Consumption of Fish and Fishery Products, Indonesia and the Philippines

### Total fish consumption per year by each economy

Economy	Population (2010)	Fish Cons. per capita (kg/yr)	Total Consumption (tonnes/yr)
Indonesia	237'641,326	30 (MMAF, 2011)	7'129,240
Philippines	92'340,000	38 (BFAR, 2003)	3'508,920

### Total fish supply per year by each economy (2009)

Economy	Capture (tonnes/yr)	Import (tonnes/yr)	Export (tonnes/yr)	Fish supply (tonnes/yr)
Indonesia	6,832,789	331,893	220,372	6'944,310
Philippines	3'339,851	202,157	181,322	3'360,686

- In both Indonesia and the Philippines there is a fish deficit; demand for fish exceeds their supply.

## Uses of SPF in Indonesia and The Philippines



## Artisanal Products

Steamed



Smoke  
d



Grille  
d



Marinate  
d



## Fish Crackers



## Display of Dry Fish



Local Market



Supermarket

## Fish Balls – Artisanal and Industrial





## Novel Products



## Use of Anchovies



Use of Anchovies



Limitations to food security

## BOTH economies are fragmented by their archipelagic nature

Indonesia —17,000 islands

Philippines —→ 7,000 islands

→ This restricts the distribution channels and physical access to SPF resources throughout the case study economies

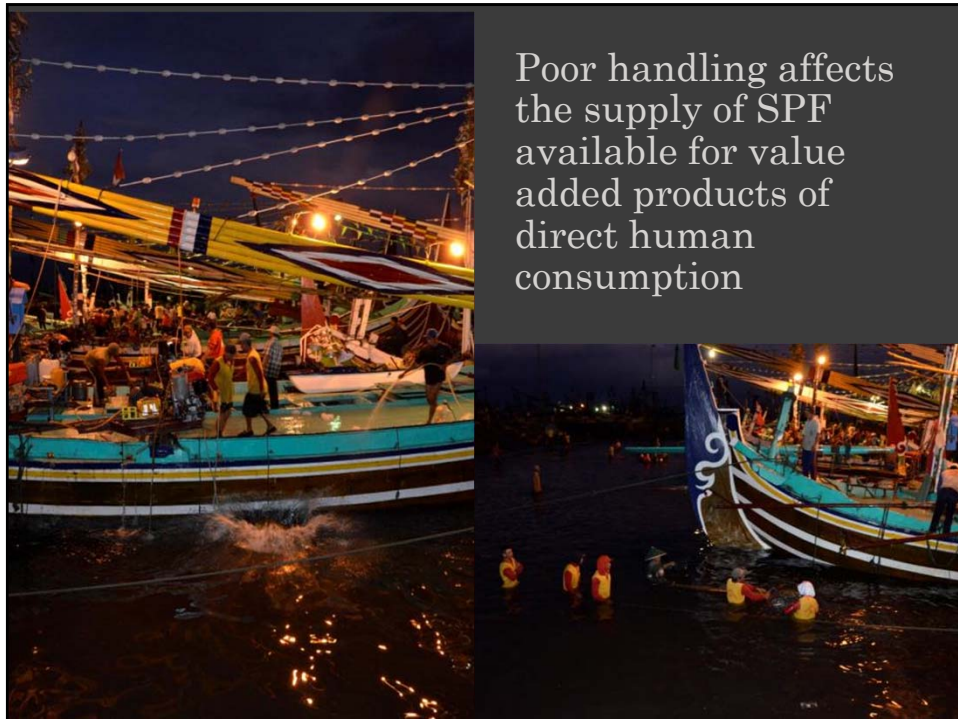
## Variable supply of raw materials

- \* Highly seasonal
- \* Unpredictable
- \* Processing plants import raw materials to sustain their production in times of scarcity
- \* The demand is not completely satisfied due to the scarcity of the SPF resources



## Value-added products

- \* Small pelagic fish are generally readily available, cheap and freshly caught as food, especially in the coastal communities and main cities
- \* Artisanal processed SPF are common, highly affordable, available and extensively used
- Hence the use of value-added products from SPF to tackle food insecurity should target the vulnerable populations in isolated and landlocked areas where fresh and artisanal products are scarce





## Lack of adequate cold storage

- \* Storage needs to be improved further with on-board chilling. The practice is not extensive in Indonesia or the Philippines due to the low monetary value of SPF and the extra investment that this requires
- \* In Indonesia the number of vessels that keep cold storages for small pelagic fish is too low and in the Philippines it could be improved; both economies are taking measures to introduce this practice in the sector
- \* Cold storages should be the basic minimum requirement for fishing vessels of SPF for direct human consumption. SPF are fragile and require cold storage to avoid deterioration and rancidity.

### Increasing demand of SPF as feed for mariculture and bait



## Opportunities to food security

## Opportunities

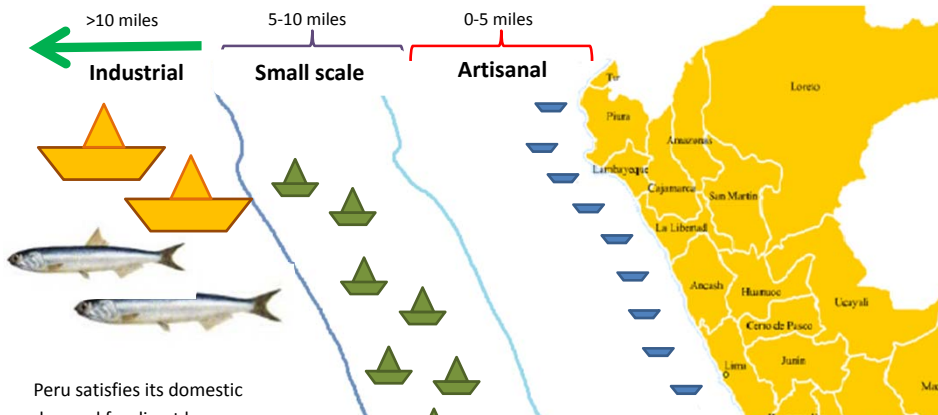
- \* Cultural preference for strong flavoured fish like SPF in Asia-Pacific
- \* A wide array of value-added products from SPF exist in the market
- \* Production of SPF follows a continuous increase for the last decade, indicating availability; it can be very high during peak seasons, when raw materials can be collected given adequate cold storage
- \* Artisanal value-added products of SPF are of key cultural value and employ a great majority of the population of small-scale fishing communities, where women play an important role
- \* There is a large potential work force to develop a value-added industry of small pelagics in both Indonesia and the Philippines



# Opportunities

- \* There is a clear fish production deficit for direct human consumption in Indonesia and the Philippines that could be satisfied by surplus SPF producing economies like Peru
- \* This will not compromise the resources available for domestic direct human consumption in Peru and it will not affect or compete with other related industries for raw materials
- \* Peru satisfies its domestic demand for direct human consumption of Peruvian anchovies with <2% of the 26% of available biomass, leaving 24% available to supply international markets without the need to increase fishing effort or to divert resources from indirect human consumption

Supreme Decree Nº 005-2012-PRODUCE



Peru satisfies its domestic demand for direct human consumption with <2% of the biomass of Peruvian anchovies, the remaining 24% is available to introduce this resource to new international markets of direct human consumption

Year	Biomass	
	0 – 10 miles (Direct human consumption)	>10 miles (Indirect human consumption)
2009	13%	87%
2010	46%	54%
2011	23%	77%
2012	25%	75%
Average	26.6%	73.4%

## SPF Products from Peru: Matured anchovies



## SPF Products from Peru: Canned



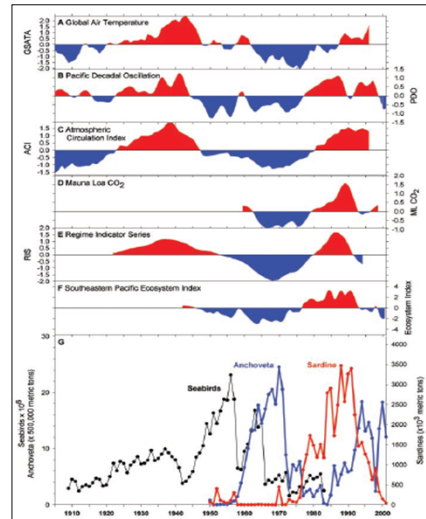
## SPF Products from Peru: Canned



## SPF Products from Peru: Canned



## Alternating Patterns of SPF in the Pacific Ocean



## Conclusions

- \* Production of SPF is high with increasing trends in Indonesia and the Philippines, however much of their stocks are overexploited and fail to cover internal consumption demands due to the large size of their human populations.
- \* Taste and preference for small pelagics are culturally printed in the population so economies with surplus production of SPF like Peru could aid to satisfy this demand through trade.


## Conclusions

- \* The greatest limitation for small pelagics to tackle food insecurity in Asia-Pacific is posed by the dissected territories of Indonesia and the Philippines, a huge challenge for distribution to the most isolated and vulnerable populations.
- \* Under this scenario, affordable added-value products SPF could be a perfect alternative as packaging could ease portability and reduce fish losses in distribution chains; however price issues need to be assessed as value-added products are generally more expensive and vulnerable populations are usually among the poorest sectors of society.

## Next Steps

1. A 2<sup>nd</sup> stage of the project should be considered to investigate the limitations that archipelagic and mountainous territories pose to food security and identify possible solutions
2. Organize a workshop on Fisheries Statistics for SPF directed by Peru to build capacity in Indonesia and the Philippines
4. Elaborate a set of guidelines for MCS that apply to artisanal fisheries in the APEC region
5. Training on postharvest by the Peruvian Institute of Fish Technology (ITP) to Indonesia and the Philippines
6. Capacity building and transfer of knowledge and technology in seaweed products from Indonesia and the Philippines to Peru
7. Research collaborations in topics related to: stock assessment, abundance alternation anchovies/sardines, mariculture, aquaculture, seaweeds, algal blooms

## SPECIAL THANKS TO:



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- MARAMING SALAMAT PO!
  - TERIMA KASIH!
  - GRACIAS!
- 